

What is claimed is:

1           1.   A self-contained programmable electronic radio  
2   system multifunction slice comprising:

3           an antenna interface;

4           a plurality of transceivers;

*1 Config Tx Rx?*

5           a processor coupled to said plurality of multi-band  
6   transceivers and operable to support at least two independent  
7   radio function threads through said plurality of multi-band  
8   transceivers; and

9           a avionics interface including a avionics network input  
10   for receiving first data to be transmitted through the  
11   transceivers and a avionics network output for second data  
12   received from the transceivers.

1           2.   The electronic radio system multifunction slice of  
2   claim 1, wherein said processor is operable to perform a  
3   digital signal processing function selected from the group  
4   consisting of modulation, demodulation, encoding/decoding,  
5   detection, encryption and decryption.

1           3.   The electronic radio system multifunction slice of  
2   claim 1, wherein said at least two radio function threads

3 support radio functions selected from the group consisting of  
4 communication, navigation, interrogation, and surveillance.

1       4. The electronic radio system multifunction slice of  
2 claim 1, wherein said at least two radio function threads  
3 support radio functions selected from the group consisting of  
4 voice radio communication, data network communication,  
5 electronic navigation aids, radio beacon detection, global  
6 and local grid positioning system detection, and friend-or-  
7 foe identification challenging and responding.

1       5. The electronic radio system multifunction slice of  
2 claim 1, wherein said antenna interface couples externally  
3 the multifunction slice to a plurality of antenna  
4 preconditioning units.

1       6. A multifunction electronic radio system comprising:  
2 a plurality of electronic radio system multifunction  
3 slices, wherein each of said plurality of electronic radio  
4 system multifunction slices comprises:

5 an antenna interface;

6 a plurality of transceivers coupled to said antenna  
7 interface; and

8           a processor, said processor being coupled to said  
9 plurality of multi-band transceivers and operable to support  
10 radio function threads through said plurality of  
11 transceivers; and

12           wherein the plurality of multifunction slices implements  
13 a predetermined set of radio functions.

1           7. The multifunction electronic radio system of claim  
2 6, further comprising a plurality of antennas, each of said  
3 antennas being coupled to an antenna preconditioner.

1           8. The multifunction electronic radio system of claim  
2 7 wherein each of said antenna preconditioners is coupled to  
3 at least one of said electronic radio system multifunction  
4 slices.

1           9. The multifunction electronic radio system of claim  
2 6, further comprising an avionics interface that provides  
3 first data for transmission to the processor and that accepts  
4 second data received by the transceivers.

1           10. The multifunction electronic radio system  
2 comprising of claim 6, wherein at least two of said  
3 electronic radio system multifunction slices are

4 interconnected though a radio network bus isolated  
5 electrically isolated from the transceivers.

1 11. A method of implementing a multifunction electronic  
2 radio system, the method comprising:

3 determining a set of radio functions to be performed by  
4 said multifunction electronic radio system;

5 assigning the radio functions in said set of radio  
6 functions across a plurality of electronic radio system  
7 multifunction slices that each include:

8 an antenna interface;

9 a plurality of transceivers;

10 a processor coupled to said plurality of transceivers  
11 and operable to support at least two radio function threads  
12 through said plurality of multi-band transceivers; and

13 an avionics interface, said avionics interface providing  
14 avionics input and output;

15 interconnecting the antenna interfaces of said plurality  
16 of electronic radio system multifunction slices to a  
17 plurality of antenna preconditioners; and

18        coupling the avionics interfaces of said plurality of  
19        electronic radio system multifunction slices to a avionics  
20        network.

1        12. The method of claim 11, further comprising the step  
2        of configuring the processor for encryption and decryption  
3        functions.

1        13. The method of claim 11, wherein the step of  
2        assigning further comprises assigning the radio functions in  
3        accordance with resource assets required by the radio  
4        functions.

1        14. The method of claim 13, wherein the step of  
2        assigning further comprises assigning the radio functions in  
3        accordance with antenna, transceiver, and processor resource  
4        assets required by the radio functions.

1        15. The method of claim 11, further comprising the step  
2        of determining mission segments and mission segment radio  
3        functions, and wherein the set of radio functions includes  
4        the mission segment radio functions.